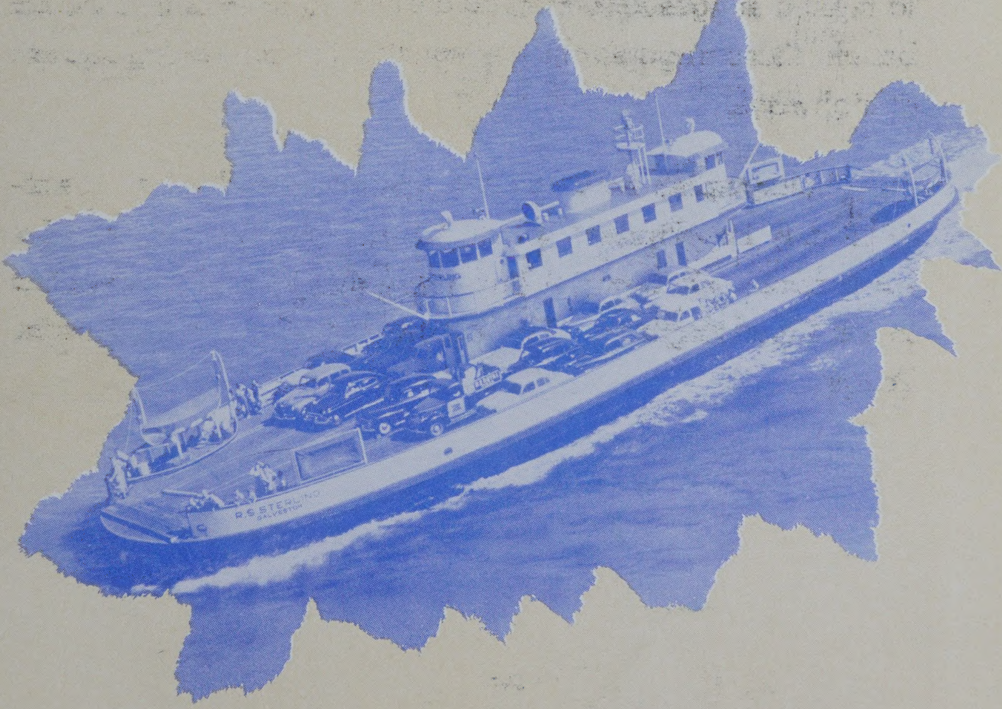
Welborn

TEXAS HIGHWAY DEPARTMENT

Construction & Maintenance

BULLETIN No. 5

Mar. 1951

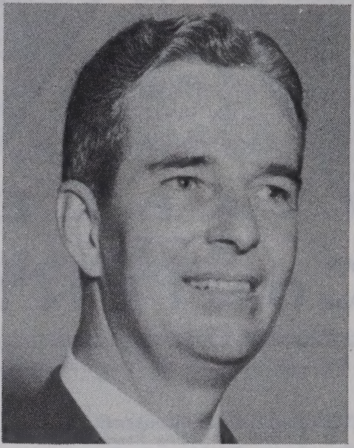


THE R. S. STERLING

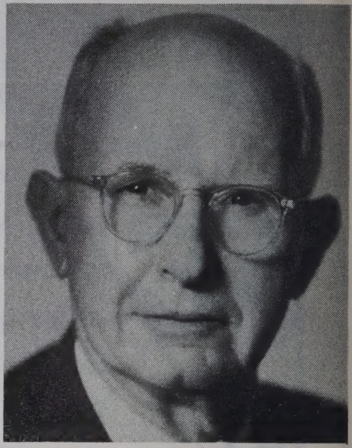
GALVESTON-PORT BOLIVAR FERRY

TEXAS HIGHWAY COMMISSION

FRED A. WEMPLE
MEMBER

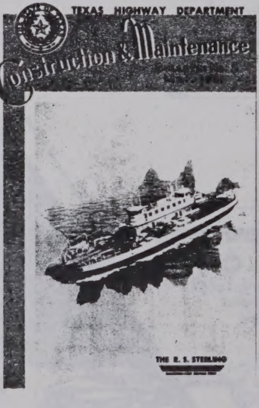


E. H. THORNTON, JR.
CHAIRMAN



ROBT. J. POTTS
MEMBER

About The Cover •••



The R. S. STERLING, along with another identical ferry boat, the CONE JOHNSON, together carry an average of over 1, 200 vehicles daily between Galveston and Port Bolivar. The vessels are designed to transport 50 cars and 400 passengers at a speed of 12 knots, or 14 miles per hour. They are 185 feet long and 55 feet in the beam, completely fireproof and are two of the few ferries in the United States complete with radar and other modern navigational aids. Two 865 horsepower diesel engines operate two generators providing 540 kilowatts each, which in turn are geared to the propeller shaft.

These two vessels cost over one million dollars and were put in operation in April of 1950. They now provide fast service, connecting State Highway 87 between Galveston and Port Arthur. The ferries leave Galveston and Port Bolivar on the hour and half hour, from 10 to 6 P. M. There is no charge for vehicles or passengers.

WELDING FOR MAINTENANCE

G. L. WILEY, *Welding Specialist*

As the nation begins re-arming it is becoming more difficult to obtain replacement parts for our maintenance equipment. Welding can often be used to repair a broken or worn part at a saving in both cost and idle time. In some cases the part which is repaired by welding is actually better than the original part. By a combination of welding and machining, for which our shops are equipped, the rebuilding or replacing of worn or broken parts is often possible. Some items which are repaired in this manner are shafting, cylinder heads, transmission cases, and engine blocks. Cast iron, malleable iron, high carbon steel, high-alloy steels and aluminum can be repaired.

Every district shop now has one or more arc-welders. (The word "welder" refers to a welding machine. The word "operator" is used when reference is made to the man who performs the welding.) It is a most valuable maintenance tool. Its value has increased as new electrodes and new methods have been developed. New techniques have been developed to suit the new electrodes. By proper use of the materials and "know-how" which is now available any metal can be satisfactorily welded. The lowest cost for a good job will result from use of the proper electrodes and the best procedure.

It is important that our welding operators and supervisors be aware of the possibilities of the "low hydrogen" ferritic type electrode, of the high nickel content arc-welding electrode for cast iron welding and of the hard surfacing rods, both arc and oxyacetylene types. The right use of these rods demands high skill and special techniques, as does the use of bronze-welding.

Repair work is of two broad classes. (1) That which is fairly simple, of moderate size and involves easy-to-weld metals. Our welding operators handle these jobs as a part of the regular days work with no technical supervision. (2) Important, highly stressed pieces of alloy or high carbon metals. These jobs should be studied and planned with the best technical assistance we can have. Besides determining the types and sizes of electrodes to use there are the items of preparation for welding, welding procedure and heat treatment (preheat and post heat) if it is important.

Having stressed the importance of welding as the answer to our maintenance problems, let us take a look at the role played by the operator in this picture of costs and quality of welding.

Agreeing wholeheartedly with Lew Gilbert, editor of Industry and Welding who says, "fixing the fault is cheaper than fixing the blame," I would like to inject some of his thoughts from an article on "Better Welding at Lower Cost."

"In the thousands of plants where welding is used primarily as a maintenance tool, costs are determined by the welding "know how" - or lack of it - on the part of supervision, which in turn is reflected in the workmanship of operators." In too many cases when welding costs are investigated, the question which is most usually of greatest importance is, "Have we done this job in the cheapest way possible?" -- not "Have we done this job in the best possible way, at the lowest possible cost?"

Among the various basic factors which tend to increase welding costs is the common problem of excessive weld metal. An operator is no better than the tools which he uses. The most highly skilled operator can turn out poor work, if his equipment is not in first-class condition. Arc-welding machines should be inspected periodically. This applies as well to oxyacetylene equipment. Torches, tips, and hose should be in good shape at all times. Electrode holders, cable, ground clamps, and terminals should be inspected frequently. Cleaning tools such as wire brushes and scale hammers should be in good condition. When these accessories are not in first-class condition, it will be reflected in time, quality of work, and subsequent cost. One of the most important "quality cost" factors, and one of the most neglected, is operator training.

Some welding operators have only remote knowledge of basic welding information, even after years of good general experience. To many of these men, a change in polarity means only to push over the switch on their generators. They know nothing of the reasons for, or results of, the change. Welding operators know that coated electrodes are handled more easily than the old, bare type, but they have no conception as to why this is so, or that different coatings produce varying results under similar welding conditions. Most operators, and unfortunately many supervisors and other buyers of electrodes, know little or nothing of the A.W.S.

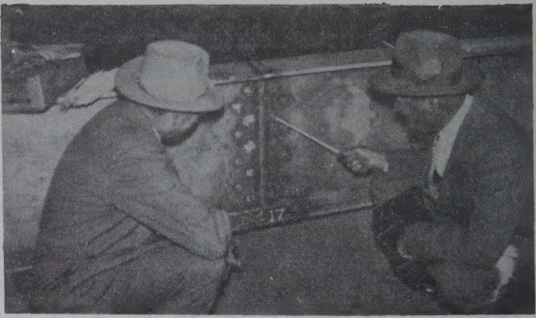
methods of electrode identification or the N. E. M. A. system of color markings. To most operators an electrode is either a "reverse polarity rod" or a "straight polarity rod;" either a "hot rod" or a "cold rod;" an "A-C rod" or a "D-C rod." In spite of the efforts of the A. W. S. and the A. S. T. M. to bring order out of the seeming chaos of the metallic arc-welding electrode situation, a state of confusion still exists among those people who should certainly know the various classifications, and understand why and how electrodes are so classified. We have failed somehow to get these facts across.

To most shop welders, preheating is an occasional necessary evil. Few understand the reason for it, or the troubles which might occur because of insufficient preheat temperatures or too rapid cooling. Most training programs teach only the art of welding. On an engineering level, welding is a science, encompassing more of the sciences than any other craft.

Since producers and fabricators have developed new types of steel for special applications, and electrode manufacturers have created new and better electrodes with which to weld them, this information should be passed on to the operator. When a welding operator has used one type of electrode for a length of time, he naturally develops a particular aptitude for it, and a tendency to use the same technique for any new rod he is asked to employ. Many of the newer electrodes require different methods of handling, the result is usually a poor quality weld. It is unfair to the welding operator to hand him a bundle of rods of a type he has never used, and expect him to produce satisfactory welds.

Some welding operators do not understand the importance of proper current values in regard to weld quality. By using excessively high currents the operator must be familiar with the types that require a high setting or trouble will be encountered with stainless and cast-iron applications. Current values may differ with certain conditions, depending quite often on the operator's ability, joint preparation, and type and thickness of material. Proper knowledge on the part of the operator concerning the effects of extreme variations in current values can do much toward eliminating such ordinary defects as rough looking welds, excessive spatter, improper or incomplete slag coverage, trapped gases and slag, and poor fusion at side walls. These things, too, tend to increase welding costs. Another possible cause of poor weld quality is the tendency on the part of some operators to minimize the importance of proper and thorough cleaning. Halfway measures are not enough where quality workmanship is desired. The expenditure of a few seconds to properly chip the slag from the crater, or some heavy particles of spatter from a side wall, should not be permitted to jeopardize the strength of a joint in service. It is also surprising to know how few operators know the correlation between arc length, amperes, and volts. It is important that they

School for welding inspectors and operators conducted in District 17. Twenty men enrolled in a nine weeks course held at A & M College.

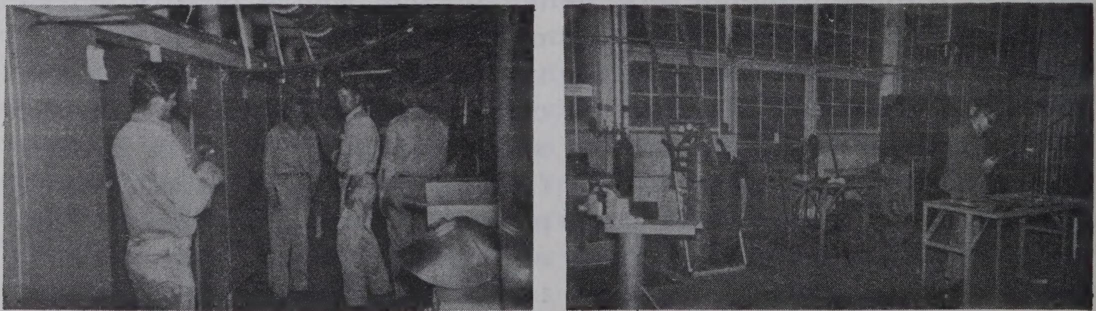


A. A. Vance and John Blair examine weld of a 24 inch beam. These salvaged beams are 20 feet long and are being welded together making 40 foot beams.

know the results of extreme variations in arc conditions because these conditions have a direct bearing on depth of penetration, size and contour of deposit, and appearance of beads. A good operator should be able to distinguish between proper and improper arc characteristics by sound, slag performance, by type and quantity of spatter, and by weld appearance.

Selection of the proper electrode size is primarily a common sense function. Not only is it faster to use a larger electrode where the work warrants it, but also much cheaper. To get quality work, at lower cost, we must all realize that "fixing the fault is better and cheaper than fixing the blame." Unless welding operators clearly understand the elements which go into producing good quality welds, they cannot consistently do so. To welding operators, supervisors, and last but maybe most important, to those buyers and users of welding equipment, supplies and accessories, many of these basic fundamentals of better welding at lower cost are still mysterious problems.

Now a word for the welding inspectors on bridges, where testing of welders to qualify is involved. The purpose of qualification tests for operators is to determine their ability to produce sound welds on the job--not just good tests plates. The A. W. S. standard qualifying tests for operators were developed as an aid in determining their ability. These tests should be considered a minimum standard rather than the ultimate, and contractors

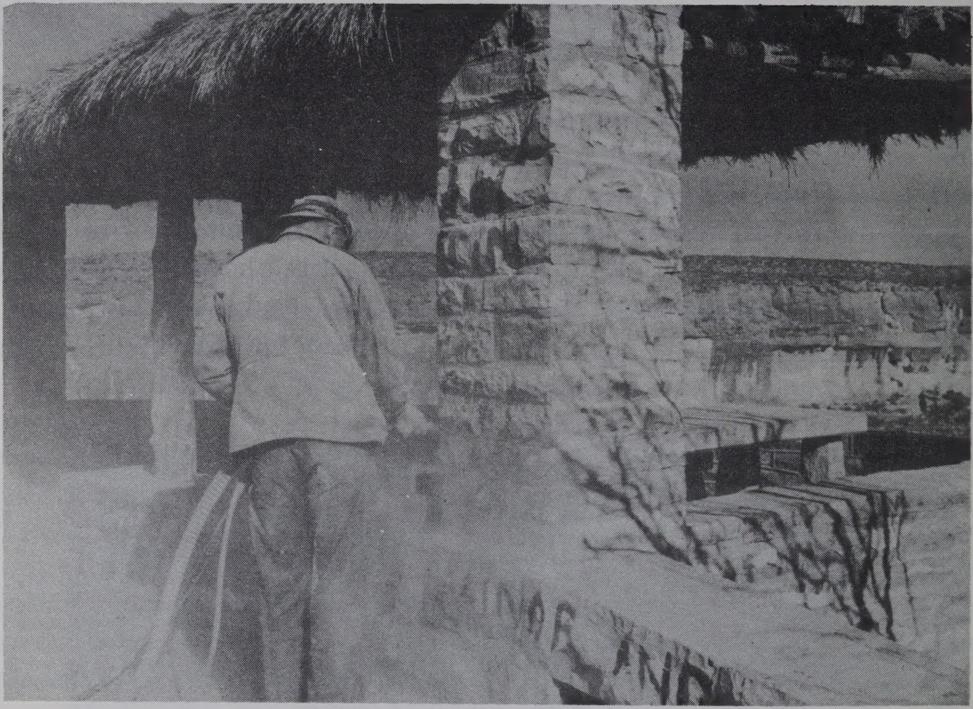


District 17 school composed of engineering personnel and men from District Shops.

should not hesitate to test beyond these standards when necessary to determine an operator's ability to do an unusual or difficult job. In certain cases where operators have failed to pass standard tests, they have been allowed to remake them, as many as three or four times, until, aided by the law of average, one has finally passed, and the operator has been considered qualified! Certainly the fallacy of such a practice is obvious. Test plates are usually made under ideal conditions. If a supposedly competent operator fails to make a satisfactory test under such conditions, how can he possibly be expected to produce an acceptable job out on a bridge beam high in the air and sometimes under windy and adverse conditions? When a test fails, it should be the duty of the party conducting the test to determine the cause of the failure. If it is the fault of defective material, improper technique or electrode, the operator should be told what was wrong, and why.

The Bridge Division has employed Mr. G. L. Wiley who is an authority on welding processes, techniques, and equipment. It is not expected that the inspection and training program of the Bridge Division will assume over 50 per cent of Mr. Wiley's time and when not engaged on Bridge Division problems, he will be available at the request of the District Engineer to visit the District Shops and advise on equipment repair and maintenance problems involving welding. He will be available to instruct welding operators and check welding equipment. Should you require the assistance of Mr. Wiley for any of the purposes outlined above or for any welding problem in your District, his services may be obtained through File D-5 or File D-4.

Another Use for the Bondact Machine



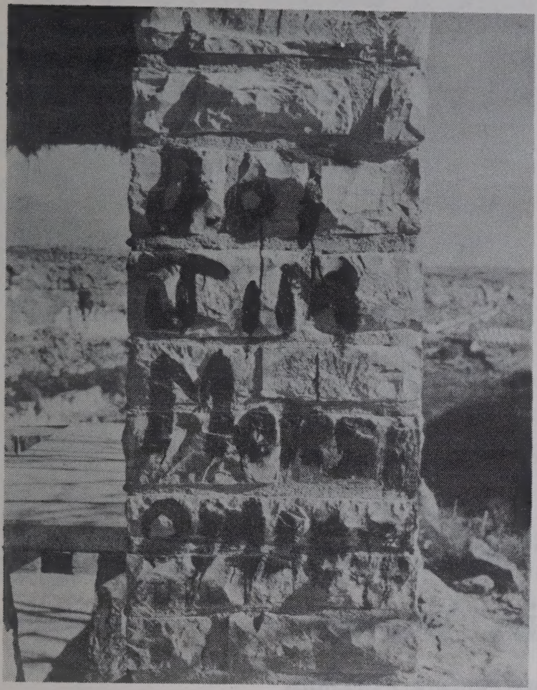
Sand blasting operations.

Reference is made to the previous article relative to the use of a Bondact machine in this district for grouting honeycomb and making minor repairs to chipped concrete. We have found another use for this equipment and are attaching several pictures showing the results of sand blasting.

I am sure you are very familiar with the manner in which the columns, curbs, wooden posts, etc. have been badly painted at the roadside park at the entrance to the Pecos Canyon. Some two or three weeks ago we used the Bondact machine in removing all the paint in this area, both from the masonry and also the wooden posts. We converted the machine from a cement gun to merely sandblasting, and pictures show the results obtained.

Submitted by **M. B. HODGES**

District Engineer



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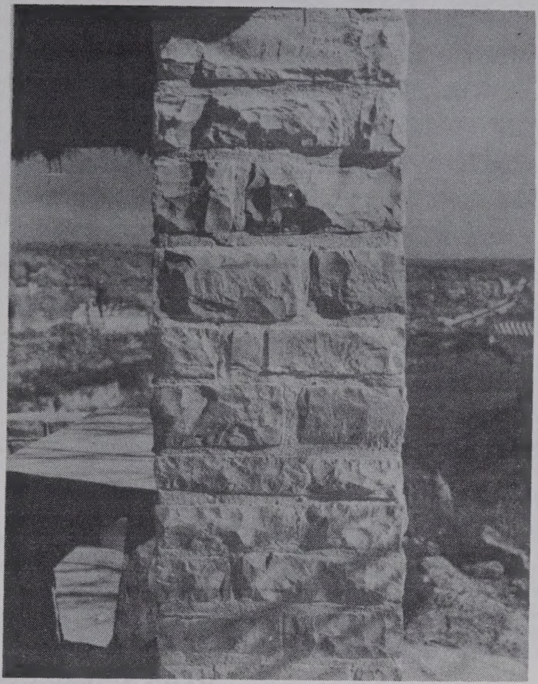

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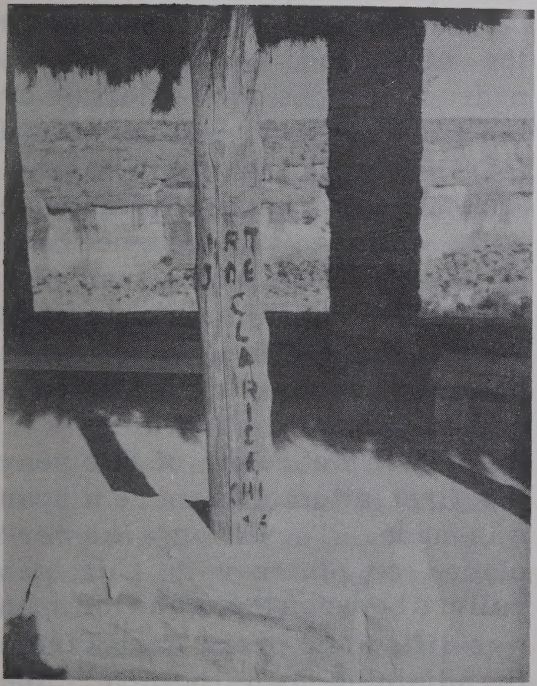

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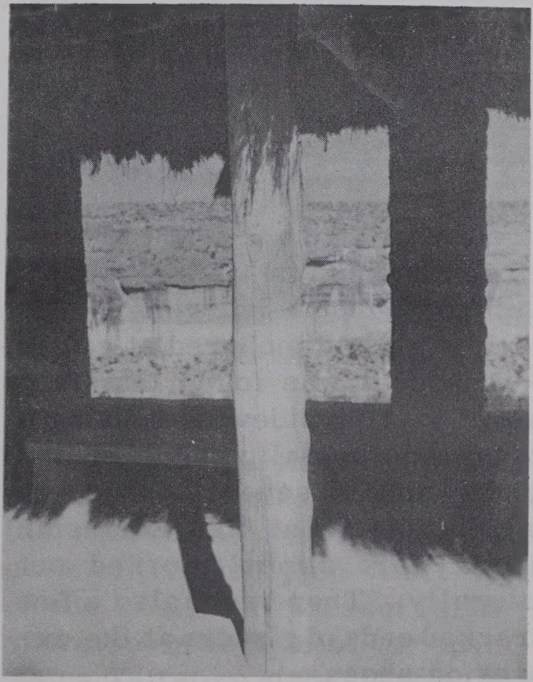

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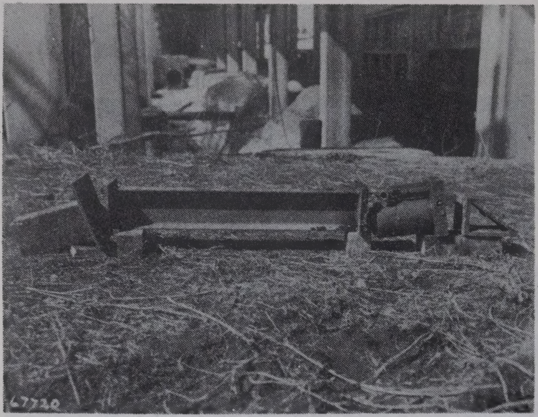
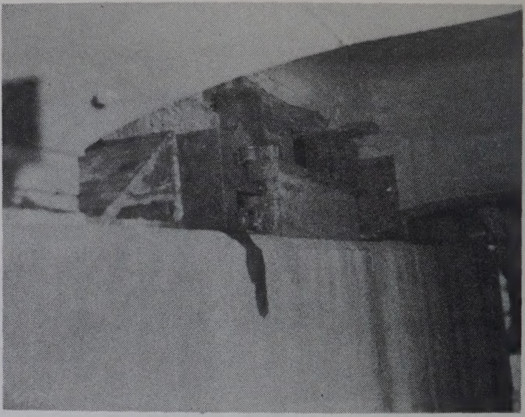


Device used in jacking against bottom plate of shoe and girder stem.



Jacking device in place.

Repairs to Eighteenth Street Viaduct in Waco

OTHA JONES, *Construction Foreman*
Robert Holliman, Skilled Laborer

Existing Structure: The existing structure was completed in 1935 and consists of four 39'-7 1/2" concrete girder spans, one 61'-3 5/8" I beam span and nineteen concrete girder spans approximately 34'-7 1/2" long all of special design.

Nature of Damage: The concrete girder spans on this structure weighing about 360,000 pounds each were not anchored at either end, and it was found that they were walking sidewise causing a dangerous misalignment of the curbs and in several cases the middle plates at the expansion shoes were almost worked out laterally. There were also a few cracked ends of girders at the expansion shoes.

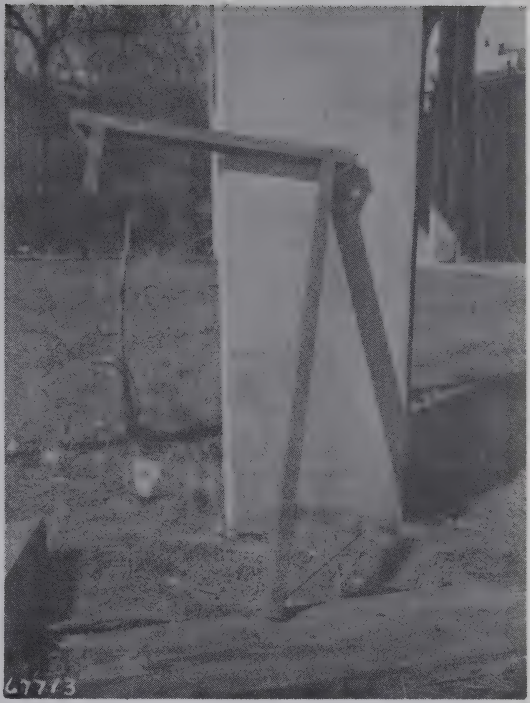
Method of Repairs: Since the spans were all tightly jammed together and held by premoulded expansion joint material, it was decided to wait until cold weather before starting the repairs. In the meantime, 18 small 25 ton hydraulic jacks and 4 larger 30 ton hydraulic jacks were acquired for lifting and moving the spans. Special platform brackets were built, and specially designed bases for the four jacks, used for moving the span sidewise were constructed. These bases were bolted by brackets around the caps and columns.

Early in February of this year the first attempt to move a span was made. The lifting jacks were placed on plates with half inch rollers between them, and the span was lifted and broke easily from the adjoining span; however, the span could not be moved sideways that afternoon due to expansion, but moved easily the following morning.

Troubles developed with jamming of the rollers between the plates and on the higher bents the use of the base device bolted around the cap became impractical due to difficulty in installation and these were all discarded. The spans were jacked up and down at least twice, and the shoes at each end were scraped clean, then greased with a heavy oil, and graphite mixture. Aligning of the spans was done by jacking against the bottom plate of two shoes at each end of the span and the stems of the next adjacent girders. The weight of the span prevented shearing the bottom plates loose from the cap. One girder stem sheared off when the load was applied, but inspection revealed that this was due to an old failure. Blocks and wedges could have been used, however, to distribute the load to the stems of four girders at each end instead of two.

Scaffolds and brackets in place on a bent.

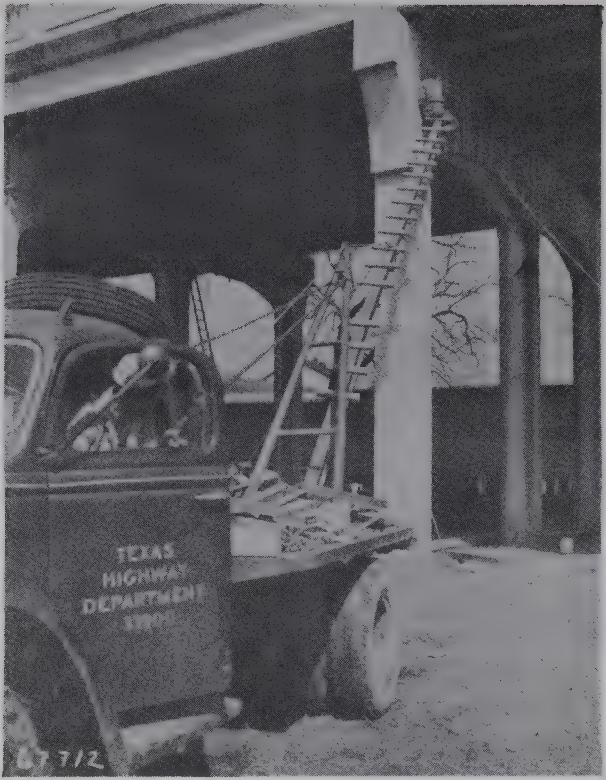
To prevent further movement of the middle plates at the expansion end, they were tack welded to the top plates. Brackets were welded to each side of the bottom shoe plate of the center girder and to the outside of the bottom shoe plate of the girder on either side of the center to prevent further sidewise movement of the span.



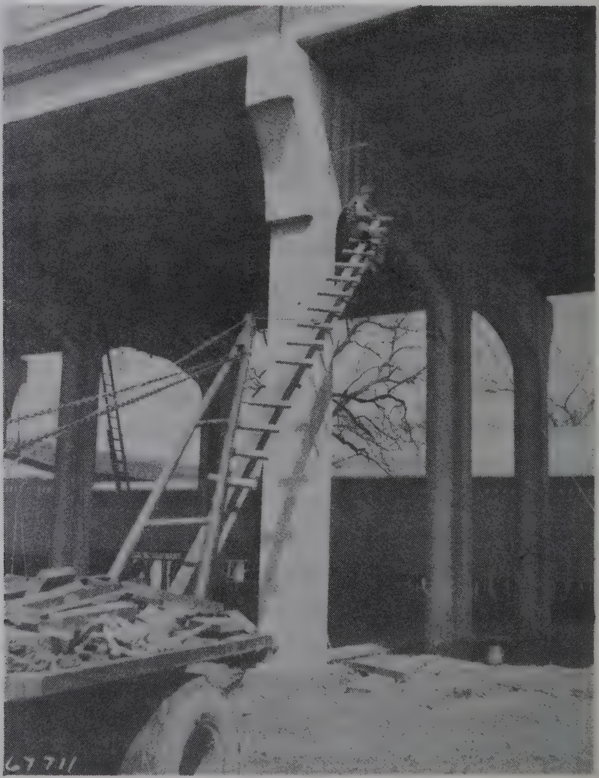
Bracket used to support scaffolds.

Bracket to prevent further sidewise movement of spans.

Cracked stem girders were repaired by use of a rocker device installed between the diaphragm and top of the cap.



Ladder used to facilitate placing and removing scaffolds.



WORK SCHEDULES OF MAINTENANCE CREWS

As of October, 1950

District	Monday Through Friday											Saturday										Total Hrs/Wk
	Forenoon					Afternoon						Forenoon						Afternoon				
	Begin				End	Begin		End				Begin			End			Begin		End		
	7:00	7:30	7:45	8:00	12:00	12:30	1:00	4:30	5:00	5:15	5:30	7:00	7:30	8:00	11:00	11:30	12:00	12:30	1:00	4:30	5:00	
1	X				X		X		X			X					X					50
2			X		X	X				X				X			X					45-
3				X	X		X		X					X			X		X		X	48
4				X	X	X		X						X			X	X		X		48
5				X	X		X		X					X			X		X		X	48
6		X			X	X			X					X			X					49
7				Varies by Maintenance Sections																		49
8				X	X		X		X					X			X		X		X	48
9		X			X	X			X				X			X						49
10	X				X		X		X			X					X					50
11		X			X	X			X				X			X						49
12				X	X		X		X					X			X		X		X	48
13		X			X	X			X				X			X						49
14		X			X		X				X			X			X					49
15		X			X	X			X				X			X						48
16		X			X	X			X				X			X						49
17		X			X	X			X				X				X					49½
18		X			X	X			X				X			X						49
19	X				X		X		X					X			X					49
20	X				X		X		X			X			X							49
21				X	X		X		X					X			X					44
22		X			X	X			X					X			X					48
23				X	X		X		X					X			X		X		X	48
24				X	X		X		X					X			X					44
25				X	X		X		X					X			X		X		X	48

District 1 - Begin 7:30 AM & 30 minute lunch Nov. through Feb.
District 2 - Only 1/3 of men work Saturday AM
District 10 - 8 hour day Monday through Friday Nov. 15 to Feb. 15
District 13 - Begin 7 AM & 1 hour lunch May through Sept.
District 15 - Work day ends 4 PM on Friday
District 19 - Begin 7:30 & 30 minute lunch during winter
District 21 - Operators service equipment Saturday PM
District 22 - 8 hours on Monday
District 23 - Begin 7 AM Monday through Thursday & no work Saturday PM May through Sept.

Tourist Industry Report

Traffic Services Division

During 1950, 2,983,000 out-of-state cars brought 8,054,000 tourists to Texas who spent a total of $276,464,000. They entered Texas at the average approximate rate of 8,172 cars per day. Of these who entered Texas via one of our Travel Information Bureaus, 13% stopped for travel aid and assistance. Of the tourists stopping, the Travel Information Bureau attendants, through the aid of maps and other material, were able to increase their itinerary of travel in Texas by approximately 7%. This represented an estimated 4,874,400 extra tourist miles driven in the state. The Bureaus rendered services to 362,339 visitors who were both residents and out-of-state visitors.

The average tourist party consisted of 2.7 people who traveled 691 miles in the state, spent $6.85 per person per day, stayed 5.01 days, and spent $92.66 during their entire visit.

The significance of this tourist industry report for 1950 is that it reveals Texas Citizens grossed 32% more money from this cash crop than in 1949. This is largely accounted for in that last year's visitors stay was 6.4% longer, the total miles motored was increased 4.9%, daily expenditures were up 2.5%, and the volume of tourists was 21% greater than in 1949.

Practically all tourists who visited a bureau were given a survey card, and in addition to other data requested, they were asked to comment on what impressed them most, regardless of what, whether good or bad, during their stay in Texas. Their comments were as follows:

*Highways and Traffic Services - 31%

Friendliness and courtesy of Texans - 25%

Scenery - 18%

Climate - 6%

Size - 5%

Good accommodations - 3%

**Poor highway markings - 2%

Cities - 2%

Desirable place to live - 1%

Bad roads - 1%

Resources - 1%

Reckless driving - 1%

Other remarks - 4%

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*This does not reflect the numerous compliments received in the Bureaus acclaiming our information services and unique features of our highway system.

**The greater majority of these complaints were critical of intersections within cities and of our present black center stripe.

THE FOLLOWING TABLE REVEALS A MONTHLY STATISTICAL BREAKDOWN

Month	Size of Party	Daily Expenditures per Person	Purpose of Visit			First Visit To Texas		Length of Stay	Visited Roadside Parks	
			Bus.	Vac.	Per.	Yes	No		Yes	No
January	2.59	$ 6.90	18%	75%	7%	44%	56%	4.7 days	45%	55%
February	2.48	7.08	11%	92%	7%	50%	50%	5.7 "	54%	46%
March	2.43	7.04	22%	84%	5%	48%	52%	5.9 "	46%	54%
April	2.36	6.62	13%	80%	7%	50%	50%	6.1 "	58%	42%
May	2.51	6.68	15%	75%	10%	48%	52%	5.8 "	59%	41%
June	2.92	6.87	7%	85%	8%	50%	50%	4.4 "	58%	42%
July	2.89	7.01	8%	79%	13%	53%	47%	5 "	50%	50%
August	3.17	7.22	10%	77%	13%	54%	46%	4.7 "	57%	43%
September	2.94	7.65	11%	72%	17%	51%	49%	4.4 "	58%	42%
October	2.54	6.77	10%	69%	21%	51%	49%	4.8 "	60%	40%
November	2.45	6.94	14%	69%	17%	49%	51%	5.5 "	53%	47%
December	2.56	7.01	17%	67%	16%	51%	49%	5.8 "	44%	56%

It is interesting to note from the above table that during our peak summer months (June, July, August, and September) more tourists were riding per car and their daily expenditures increased proportionately but their length of stay was shorter than during the other seasons. It seems that most of our bonafide vacationers arrived in February, March, and April, and many during this season visited Texas for the first time. Most of the people who came for business purposes arrived during the winter (November through March.)

One unusual factor revealed in this table is that the seasons have very little effect on the usage of our roadside parks. Obviously, these figures do not reflect seasonal popularity of these parks but do indicate that our out-of-state motorists used or visited a roadside park either out of desire or curiosity.

The information and data used in compiling this report was obtained largely through our survey cards which are distributed to tourists visiting a bureau. Approximately 6,288, or 22.7% of these cards were filled out by tourists after their visit and returned to this office. The other statistical data used was obtained by our Information Bureau attendants through visual surveys, personal observations, and contact with the traveling public.

In an effort to determine the extent of the effect of the current international situation on travel, we have made periodic spot surveys. These surveys indicate that the trips of 35% of our current bureau visitors were prompted, directly or indirectly, by the national emergency. This figure is made up of 27% out-of-state visitors and 8% Texas motorists. About 11% of these motorists planned to visit military installations, defense plants, or military personnel. A large number of these tourists are taking their vacations prematurely because they feel that travel will be curtailed through rationing, or that they will be in military service later.

To meet the changing needs of the motoring public, we have adopted a more conservative policy in our bureaus and are diverting our efforts to more essential functions. The Travel Information Bureaus have been geared to assist military travel throughout the country. Each Information Bureau has the names and addresses of all military installations in the United States.

"---- and oh yea, er, don't pay any attention to the signals at the railroad crossings."

WATER-FILLED PNEUMATIC TIRES

J. F. SNYDER, *District Engineer*

In the interest of economical equipment operation and savings in wasted labor time, we would like to pass on to you information concerning the use of one hundred per cent water-filled pneumatic tires.

We are all familiar with the use of water in large pneumatic tires to increase traction; also, the use of water to replace most of the air to make the tire run cooler, but the advantages and benefits to be gained by the use of one hundred per cent water and complete elimination of air may or may not be realized.

In our attempt to cut down loss of time in our weed mowing operations, we tried puncture proof tubes, reliners, etc., and finally tried using one hundred per cent water in place of air. This proved promising, so we had two or three units prepared for further study, which resulted in almost entirely eliminating punctures from thorns and small nails. The use of water-filled tires was then extended to our maintainers, and with remarkable results. We had considerable trouble with "wobble" on the large front wheels now coming with our maintainers, and this "wobble" was completely eliminated when the tires were filled with water.

Having these tires filled by commercial dealers cost $4 to $7 per tire, or $16 to $30 per unit, which was rather high, but still economical in the long run. In June of last year we requested the Equipment Division to purchase a unit for filling tires with water, and since then we have filled all pneumatic tires except trucks, pick-ups, and automobiles, and have practically eliminated punctures from thorns and small nails. It appears, judging from the service the first water-filled tires have given us, that the use of water would practically double the life of the tires. Picture 1 shows the condition of recapped tires after two years use.

Most of our mowers are now in the District Shop for general repairs and reconditioning for the coming season, and several tires have been removed for recapping. The two rear tires and tubes inspected by the writer had forty-two small thorn and nail punctures but the tires were standing up when brought to the shop and showed no indication of leaking. When the water was removed and refilled with air, everyone of

these punctures leaked and would have been a flat if filled with air.

A flat tire on a mower out on a job will result in not less than four hours lost mowing time, possibly time of a shop employee and equipment rental from the shop. If the mowerman loses four hours at $1 per hour, that would be $4. Forty-two flats times $4 equals $168 and not counting shop time or equipment rental used in getting this machine back in operation. This is for one season and one machine. Multiply this by the number of mowers in use plus the maintainers and other pneumatic tired equipment, such as small tractors, rollers, and asphalt heaters, subject to such punctures, and some idea of the saving will be realized. Of course, in North Texas anti-freeze would be used during the winter months, which would add a small expense to the use of water, and in our opinion would still be economical.

The tire filling unit in use in this District is a gasoline-driven Gorman Rupp and cost $180, so you see that on one mowing unit we practically saved the cost of this machine. Pictures of the unit are shown.

Excerpts From the Audit Report . . .

Prepared by the Office of State Auditor
Fiscal Year Ending August 31, 1950

Net inventory variations for the entire Department at August 31, 1950 were approximately 1/10 of 1 per cent - an indication of an excellent inventory record and handling.

During the year ended August 31, 1950, construction projects totaling $74,535,549.62 were started on 4,085.14 miles of highways.

Construction projects completed during the same year totaled $77,931,373.68 on 3,139.14 miles.

In examining the issued oversize and overweight permits, we noted several deviations from the requirements of the Statutes. The most common of these were:

1. Permits issued without bonds to cover damages that might be sustained.
2. Omission of load equipment descriptions on permits.
3. No signatures on the applications.
4. Permits not issued in numerical order, indicating issues made without fees with copies held until fee and bond received.
5. Time permits (30, 60, and 90 day) issued without stating highway and distance over which load and equipment are to be transported. Such statements as "Over all highways in State Highway System" usually used.

There were indications also that permits in some instances were being telegraphed to applicants prior to receipt of fees. One District was found to be telegraphing permits to applicants and paying for the cost thereof with State Highway Funds. Maintenance Division personnel discussed these and other errors of procedure in detail with the District Accountants at their annual state meeting in an effort to minimize if not eliminate such errors in the future.

While checking the office records and warehouse inventories in one district we found descriptions of material on purchase orders that did not agree with the related firm's invoices, and instances where descriptions on both the purchase orders and the firm's invoice did not agree with the material actually received. These discrepancies were called to the attention of the Department's traveling auditors who immediately started a detailed audit and investigation of these and other transactions and furnished us with a copy of their report thereon. Although there was no evidence of personal gain on the part of anyone, we have been assured that corrective measures have been taken by changing the responsible warehouse personnel for failure to follow instructions, and that the employees currently responsible have been instructed thoroughly in the proper procedures for adequate controls as outlined in the Department's field accounting manual.

NEW SECTION WAREHOUSE AT AMARILLO

REINFORCING I-BEAM SPANS BY WELDING

ELTON B. EVANS
Bosque County Residency

Reinforcement of the top flange over the intermediate piers on the 195 foot continuous I-beam spans of two bridges in Bosque County, District 9, was necessary when the top cover plates were left off due to misinterpretation of the design drawings by the fabricator. The two bridges were already completed when the mistake was discovered, thereby eliminating the possibility of welding the plates on top of the beam flange as originally intended.

It was decided that plates be added to the underside of the top flange by welding to obtain the required section modulus. Figure 1 shows the arrangement of the plates.

The three main problems involved in welding the plates in the desired position were:

1. The cutting away of a portion of the diaphragm to permit placing of the plates without materially affecting the strength of the diaphragm connection. See Figure 2.
2. The longitudinal expanding of the plates the desired amount before welding so that they would carry their proportionate part of the dead load.
3. The welding of the plates to the beam without causing excessive spalling of the concrete slab due to heat.

That portion of the stringer diaphragm flange which extended under the top flange of the stringer

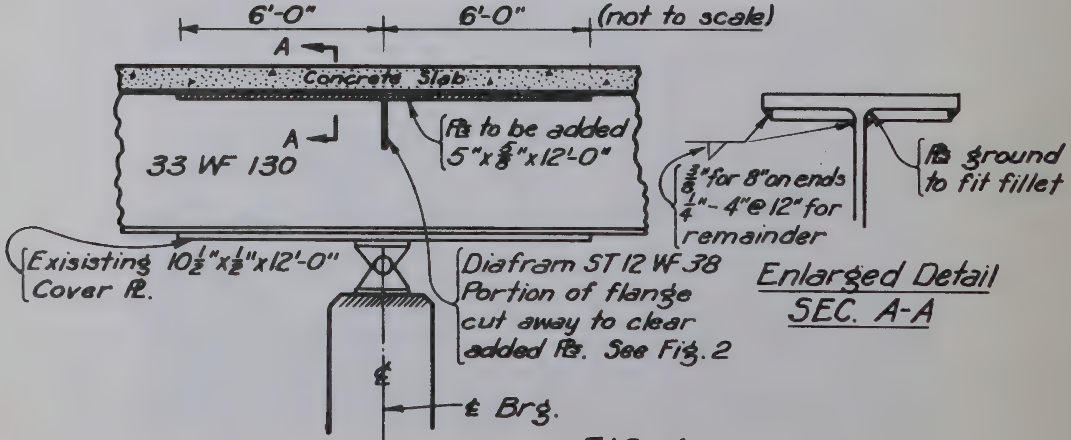

6'-0"
6'-0"
(not to scale)
A
Concrete Slab
A
33 WF 130
PLs to be added 5"x5/8"x12'-0"
3/8" for 8" on ends 1/4"-4" @ 12" for remainder
PLs ground to fit fillet
Exisisting 10 1/2"x1/2"x12'-0" Cover PL.
Diafram ST 12 WF 38 Portion of flange cut away to clear added PLs. See Fig. 2
Enlarged Detail SEC. A-A
℄
℄ Brg.

FIG. 1

(shaded area of Figure 2) was cut away without damaging the connection of the diaphragm.

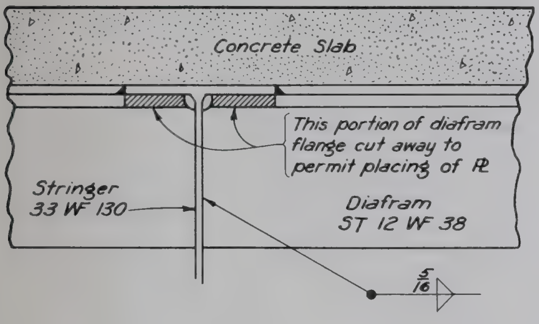

Concrete Slab
This portion of diafram flange cut away to permit placing of PL
Stringer 33 WF 130
Diafram ST 12 WF 38
5/16

FIG. 2

The longitudinal expansion of the plates was accomplished by first welding one end of the plate to the stringer flange and then applying heat to the plate with a torch. The problem of measuring the desired expansion accurately was solved by the use of a dial indicator with increments of 0.001 inch. The desired amount of expansion in this instance was 0.045 inch. The dial indicator was set up as shown in Figure 3.

Note by D-5: "A strict design analysis of the stresses both before and after addition of plates indicates that the stresses can be computed within reasonable limits only. The refinements used in measuring the strains probably greatly exceed the accuracy to which the stresses can be computed. However, this highly accurate manner of measuring the strains was done as easily as the alternate method of direct measurement with a scale, and the results from the latter method would have been so inaccurate that the resulting participation of the added plates in carrying the stresses would not have met the assumptions of the designer."

After considerable experimentation it was found that the most satisfactory procedure was to apply heat to the plate until the expansion reached about 0.048 inch; reduce the rate of application of heat allowing the plate to cool slowly until the expansion was about 0.046 inch; and then begin welding the second end of the plate to the beam flange. The first weld pass was made on the inside of the plate to the stringer web and toward the end of the plate. The second weld pass was made on the outside of the plate and also toward the end of the plate. The direction of the passes was then alternated until the 3/8 inch fillet was completed. Heat from the torch was used as needed to keep the expansion of the plate constant.

Fig. 3

Additional expansion of the end of the plate was caused by the welding heat. This additional expansion amounted to about 0.010 inch; however, this expansion was lost when the plate cooled to the temperature of the beam flange. The dial indicator was not removed until the welded parts had returned to normal temperature at which time the dial indicator was read and moved to the next plate to be welded. Thirty-two plates were added. The maximum final reading was 0.049 inch; the the minimum final reading was 0.041 in.; and the average final reading was 0.045 in.

The work over the first three piers was done with the use of only one dial indicator, neglecting the relative expansion of the plate on the opposite side of the beam flange due to the engagement of the first plate. This resulted in the second plate being stressed more than the first; that is, the total = 0.045 inch + d, d being the amount of relative expansion of plate number 2 caused by fixing plate number 1. This amount was roughly estimated as 0.009 inch.

An additional dial indicator was obtained for the work over the fourth and final pier. This second indicator was then set up to measure the expansion of plate number 2 relative to the beam flange due to fixing plate number 1. This expansion averaged 0.007 inch.

The information obtained by using two dial indicators revealed the fact that half the plates on the three previous piers had been stressed slightly more than intended, or an average of 1460 p.s.i. more than the plates on the opposite side of the beams.

When the work was begun the temperature was mild and before it was completed there was a typical Texas "norther" and the work was complicated by rapid cooling of the plates. It became more difficult to keep the expansion of the plates constant during welding.

Total cost of reinforcing the sixteen beams over four piers was $2044.23, with a corresponding increase in rating from a H 14.7 to a H 20. Approximately 25 per cent of this cost was for scaffolding as the tops of the piers averaged about 35 feet above water level.

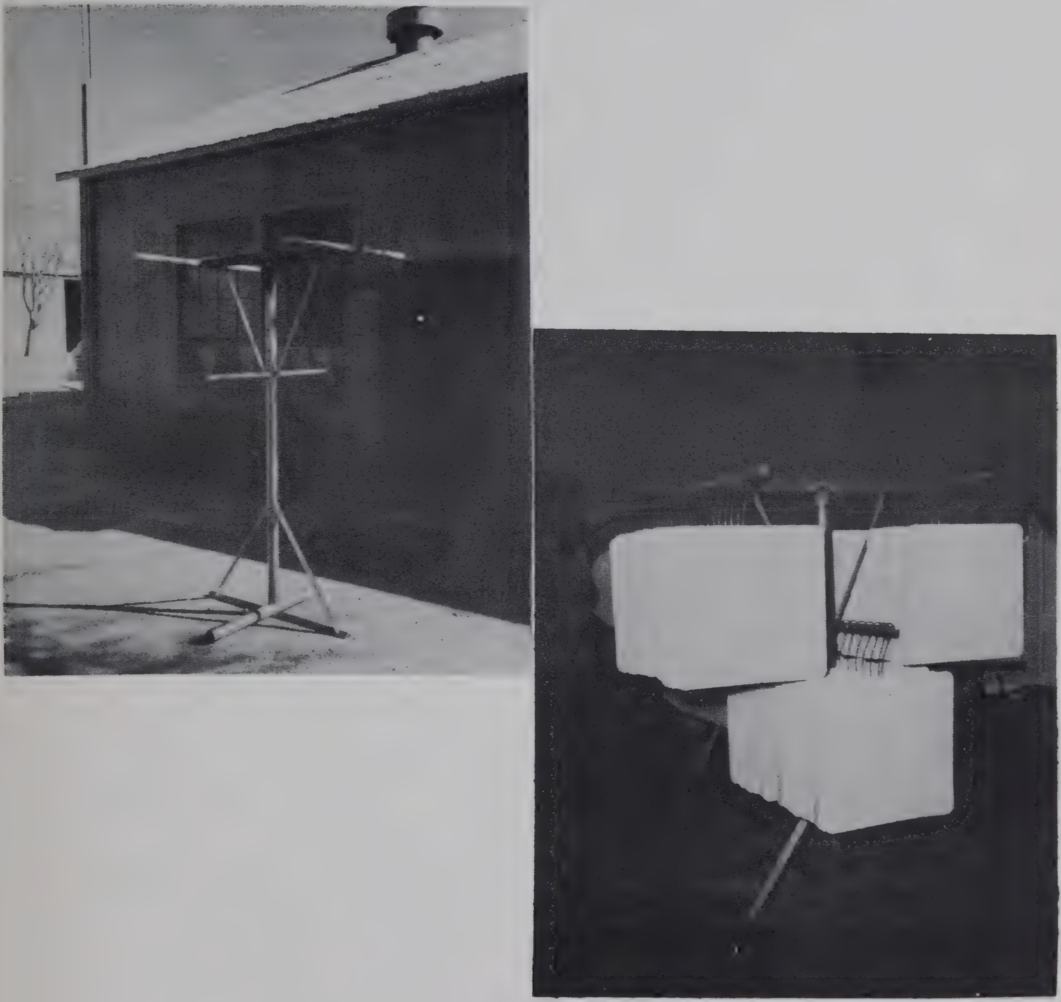
It is hoped that the information obtained in strengthening these two bridges may prove of value to other districts. There may be other beam spans that can be reinforced economically in a similar manner.

* * *

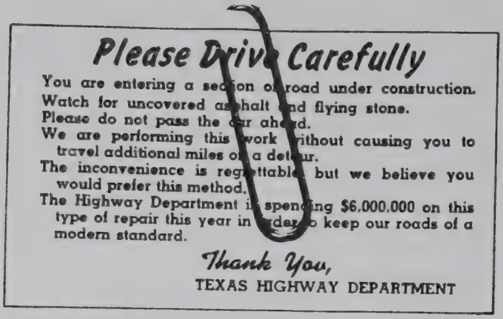
If all the paved highways in Texas were straightened and laid end to end, they would reach around the earth at the equator one and a half times.

One Solution to a Common Problem ...

M. B. HODGES, *District Engineer*



Pictured is a sign rack designed in District 22 to accommodate more signs while drying after painting. This rack will hold 96 signs of a size not to exceed 42 square inches when hung diagonally.



Please Drive Carefully

You are entering a section of road under construction.
Watch for uncovered asphalt and flying stone.
Please do not pass the car ahead.
We are performing this work without causing you to travel additional miles of a detour.
The inconvenience is regrettable, but we believe you would prefer this method.
The Highway Department is spending $6,000,000 on this type of repair this year in order to keep our roads of a modern standard.

Thank You,
TEXAS HIGHWAY DEPARTMENT

3530 North Stone Avenue
Tucson, Arizona
11 December 1950

Governor Shivers Esq.
State Capitol
Austin, Texas

Dear Governor Shivers:

This is written to let you know that during the past year, I have had occasion to drive across your fine state eight times, during the past year and one half, I should say.

You not only have the finest highway system in the nation but also the most courteous highway employees in the world.

Imagine ones feeling, upon coming to a section of highway under repair, to be handed one of the enclosed cards, with a courteous explanation about what is being done. It's simply fine and is so unusual that I think you should send some of these cards to the Governors of other States, - - -

And you are able to build and maintain these highways without the high sales and gasoline taxes that prevail in the other states, - - - .

I am a native of - - - , but sir, your state is far superior in every way.

I salute you sir, as the head of not only a fine state, but an empire.

Yours very appreciatively,

S/ Lt. Cmdr. John M. O'Neil

EXECUTIVE DEPARTMENT
AUSTIN, TEXAS

ALLAN SHIVERS
GOVERNOR

December 19, 1950

Lt. Cmdr. John M. O'Neil
3530 North Stone Avenue
Tucson, Arizona

Dear Lt. Cmdr. O'Neil:

Thank you ever so much for your kind letter of December 11 with reference to your recent trips to Texas and the Texas Highway Department.

Your courtesy in writing is indeed appreciated, and we are pleased that you have enjoyed your visits to Texas.

It is our hope that you will be able to return in the near future.

I am taking the liberty of sharing a copy of your letter with Mr. D. C. Greer, State Highway Engineer, State Highway Department.

Sincerely yours,

Allan Shivers

ALLAN SHIVERS

AS:ymm

cc: Mr. D. C. Greer
State Highway Engineer

Placing Asphaltic Concrete Pavement

ZAY JOHNSON, *District Maintenance Engineer*

District 13 has secured very good results in blade applied asphaltic concrete surfaces. In directing the work, Mr. Zay Johnson, District Maintenance Engineer, prepared the following procedure outline for placing "Hot Mixed-Cold Laid" asphaltic concrete and he reports that it is very helpful in instructing the men on the job.

It is noted that the District has a Seaman pulverizer which is used to break up any balls in the material. Mr. Johnson believes the pulverizing is a worthy operation, but that satisfactory jobs can be secured without it.

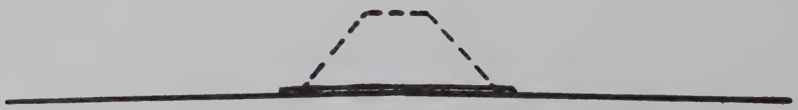
Tack coat of RC-2 should always be spread with pneumatic rollers as soon as placed. In all blading operations, maintainer wheels, both front and rear, should never be allowed to run on the edge of a roll of material except along the edge of the pavement. In case of rain, all operations should be stopped immediately and resumed only when the surface of the road has dried. In case of rain when part of the material has been spread, such material should be put back in windrows and a complete new start made. When, for any reason, an additional tack coat is necessary, RC-2 should be diluted with 50 per cent gasoline and distributed cold at a rate of not over .03 gallon per square yard.

All layers spread on the road should be as thick as the largest stone in the mixture. The first two layers are generally for leveling up the old pavement and thickness of the material in these two layers applies to the depressions of the old pavement.

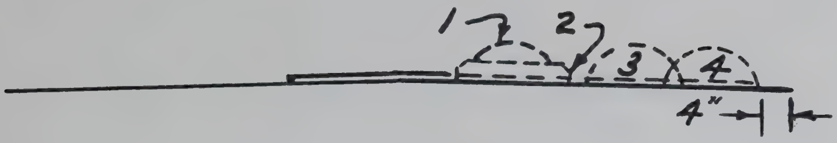
Pneumatic rollers should turn at 1/2 or 1/3 point of land so that maintainers will not have to wait on them.

A six-foot wide tack coat should be placed in the middle of road and material dumped on tack. Material should then be bladed and broomed into a tight windrow. A two-load gap should be left at the end of each day's work so that maintainers will not have to turn on windrow, and gaps should be left for all side roads and narrow bridges. These gaps should be filled first thing the following day before beginning blading operations.

Operation 1

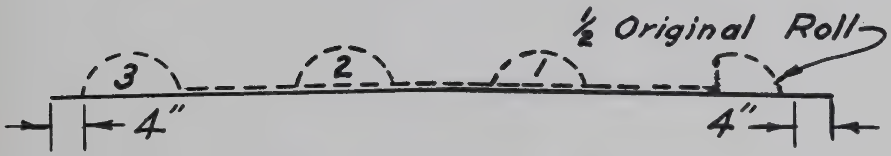


Operation 2



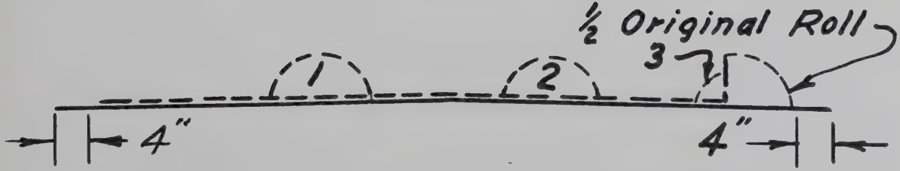
1. Operation of maintainer #1.
2. Operation of pulverizer.
3. Operation of maintainer #2.
4. Operation of maintainer #3.

Operation 3



1. Operation of maintainer #1.
2. Operation of maintainer #2.
3. Operation of maintainer #3.

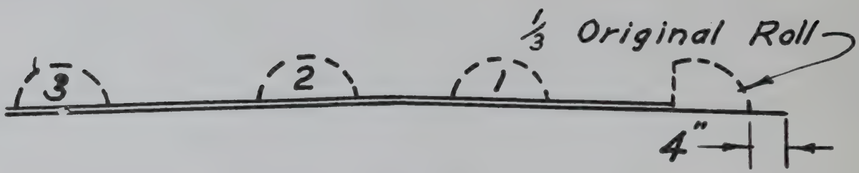
After spreading, roll once with pneumatic rollers before spreading second layer.



1. Maintainer #1.
2. Maintainer #2.
3. Maintainer #3.

After spreading material, roll twice with pneumatic rollers.

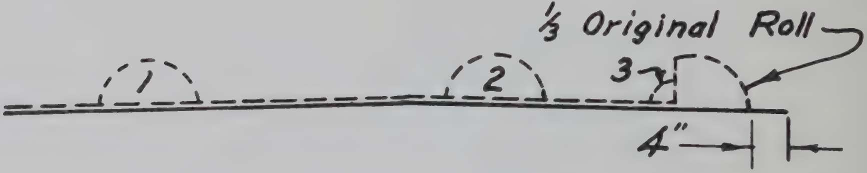
Operation 4



1. Maintainer #1.
2. Maintainer #2.
3. Maintainer #3.

In this operation the residue of former blading operations and a portion of new material should be carried across pavement without losing any of the material. The surface should be rolled twice over behind the maintainers.

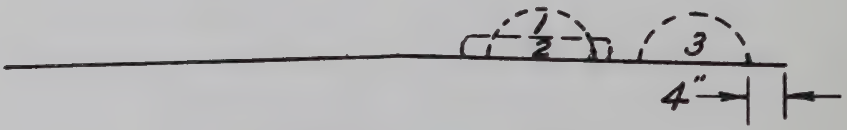
Operation 5



1. Maintainer #1-Tight blade outside edge of pavement.
2. Maintainer #2.
3. Maintainer #3.

After this layer is spread, roll twice over with pneumatic rollers.

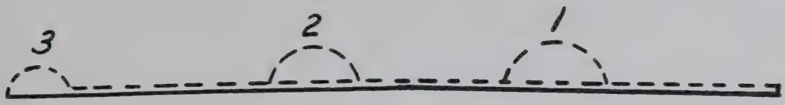
Operation 6



1. Maintainer #1.
2. Pulverizer.
3. Maintainer #2.

In this operation, material is cut in, pulverized, and placed back on edge of road.

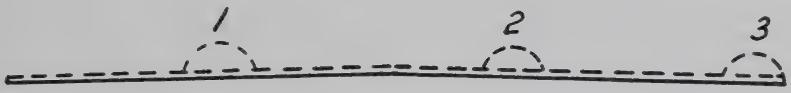
Operation 7



1. Maintainer #1 - Tight blade edge of pavement.
2. Maintainer #2.
3. Maintainer #3.

After this operation, roll twice with pneumatic rollers.

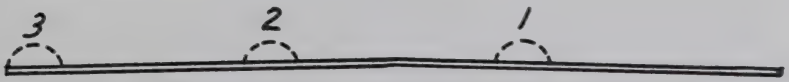
Operation 8



1. Maintainer #1.
2. Maintainer #2.
3. Maintainer #3.

Roll twice over with pneumatic roller.

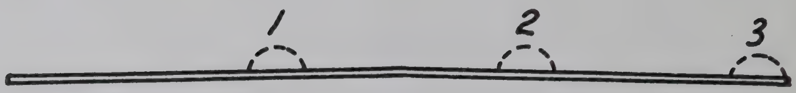
Operation 9



1. Maintainer #1.
2. Maintainer #2.
3. Maintainer #3.

In this operation, the small residual roll is taken to opposite side of pavement without losing any of it. Pneumatic roll continuously.

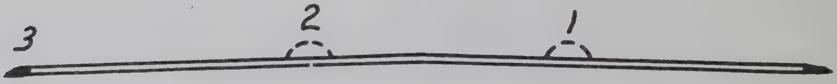
Operation 10



1. Maintainer #1.
2. Maintainer #2.
3. Maintainer #3.

In this operation, carry roll across pavement with tight blade.

Operation 11



1. Maintainer #1.
2. Maintainer #2.
3. Maintainer #3.

In this operation, about 1/2 of residual roll is "kicked" off the edge of pavement with the front end of the blade and balance of the material carried to opposite side of pavement and pushed over the edge--pneumatic roll continuously.

Roll with ten-ton flat wheel roller.

US 87 east of Cuero -- 60#/S. Y. over double asphalt surface treatment and flexible base.

US 90 east of Waelder -- 75#/S. Y. over concrete pavement.

Road Conditions

FRED T. BENNETT

Engineer, Traffic Services

As you have previously been informed, we have changed the system of reporting statewide road conditions during inclement weather, namely, the duty of collecting and disseminating this information has been placed in the Traffic Services Division. The information is compiled in D-16 and teletyped back to each respective district and to our Travel Information Bureaus. The information is then released through any news media that the District Engineer desires to use.

As requested in Mr. Greer's Circular Letter revising the setup of this operation, each district has selected one employee with an alternate for the duty of collecting and teletyping to D-16 in Austin by 9 A. M. any information regarding sleet, snow, ice, flood, dust storm, or any type of inclement weather affecting roads that would inconvenience the motorist or cause travel to be dangerous. It is very desirable that the reports from the district also include, if possible, a forecast of road conditions for the entire day. This will obviate the district's preparing an afternoon report during the extreme weather. It shall be assumed that all roads shown on the Official Highway Map are in good condition and traffic is normal throughout your district unless a road condition report to the contrary is submitted to D-16 prior to 9 A. M.

We believe that this service is highly appreciated by the traveling public, and with your usual cooperation we are sure that it can be improved upon as we gain a little more experience in handling the operation in this office.

The following men have been delegated and charged with the responsibility of furnishing this road information for their respective districts:

Road Condition Reports

District No.		Alternate
1 Paris	W. M. Heath Tel: 919-W	T. M. Hagood Jr. Tel: 3453W
2 Fort Worth	A. W. Boyd Tel: PE-9689	W. W. Potter Tel: SU-7280
3 Wichita Falls	L. E. Morris Tel: 6164	O. W. Garrett Tel: 2-2509
4 Amarillo	J. M. Harris Tel: 2-2181	Charles W. Smith Tel: 2-5673

5	Lubbock	R. W. Tucker Tel: 4233	J. D. Willson Tel: 3-3392
6	Pecos	W. A. Davis Tel: 770-J	W. E. Kelly Tel: 327-W
7	San Angelo	T. A. Henderson Tel: 3407	
8	Abilene	E. W. Couch Tel: 3578	R. L. Daugherty Tel: 22-273
9	Waco	J. A. Snell Tel: 4-4295	H. E. Chiles Tel: 2-7603
10	Tyler	Carl Hitt Tel: 646 out of Lindale, Tex.	F. G. Rankin Tel: 2-3210
11	Lufkin	J. M. York Tel: 2070	C. T. Currie Tel: 497
12	Houston	George P. Munson Jr. Tel: MA-5878	L. T. Mings Tel: MA-3414
13	Yoakum	Zay Johnson Tel: 431	H. C. Veazey Tel: 236-W
14	Austin	R. R. Schroeter Tel: 533378	J. D. Staples Tel: 533678
15	San Antonio	H. W. McCabe Tel: T-5773	Charles T. Holmes Tel: L4-8888
16	Corpus Christi	T. O. Foster Jr. Tel: 2-7573	Robert E. Johnston Tel: 3-4683
17	Bryan	D. L. Hogan Tel: 2-1581	Q. Dyess Tel: 2-7699
18	Dallas	W. B. Purcell Tel: FE 3653	Leon Harris Tel: EV 1894
19	Atlanta	Roy Johnston Tel: 729	Ed Bluestein Tel: 285
20	Beaumont	Milton Hayes Tel: 4-7393	Harry Gray Tel: 2-6741
21	Pharr	Tracy Haliburton Tel: 117	Clyde Salter Tel: 389-M
22	Del Rio	C. N. Parsons Tel: 396	W. L. Ford Tel: 321
23	Brownwood	W. T. Moore Tel: 4419	
24	El Paso	Max W. Moore Tel: 5-4589	Victor Searcy Tel: 5-5835
25	Childress	Palmer Massey Tel: 552-W	D. R. Doshier Tel: 648-J

"With all our tax money, looks like they'd at least furnish hot water!"

-116

TEXAS HIGHWAY DEPARTMENT

Pharr, Texas
January 22, 1951

REFER TO FILE NO.

District 21
YP-6 Yellow Equipment Enamel
Requisition 21-378

Austin Office D-4

Dear Sir:

We are enclosing herewith District Requisition 21-378 for 96 quarts of YP-6 yellow equipment enamel.

The last shipment of YP-6, which was - - - - - - - - - - - , purchased under Purchase Order No. 53123, Requisition A-647, at a cost of 67¢ a quart, is not satisfactory for our use because to be used in an air gun, it must be thinned to a point where it will soon chalk, and when applied with a brush, it does not flow properly, tends to ball, and results in using considerably more paint than necessary. The color is about the only satisfactory feature.

In April we received YP-6 which was made by - - - - - - - , priced at $1.05 a quart, which was satisfactory in every way and gave very good results when used with either an air gun or a brush. If at all possible, we would prefer the - - - - - - - - .

We are wondering if you had other complaints with this - - - - - - - - enamel.

Yours very truly,

J. F. Snyder
District Engineer

JFS/yhe
Encl.

COMMISSION

FRED A. WEMPLE, CHAIRMAN
A. F. MITCHELL
ROBT. J. POTTS

TEXAS HIGHWAY DEPARTMENT
Austin 3, Texas

STATE HIGHWAY ENGINEER
D. C. GREER

February 8,1951

FILE NO. D-9

Mr. J. F. Snyder
District Engineer
District No. 21
Pharr, Texas

Dear Mr. Snyder:

The sample of YP-6, manufactured by - - - - - - - Company on Requisition No. A 647, Board of Control No. 53123, submitted by you has been examined and found to be within specifications.

Possibly, one explanation for the difficulty you are having is that the first YP-6 was supplied at a viscosity ready for application, while subsequent orders were supplied at viscosities that would require thinning before application. This change was made as the higher viscosity allows longer storage of the enamel because settling is reduced, and it allows the painter some latitude in adjusting the paint to suit each individual requirement. If the paint is to be sprayed or brushed under adverse drying conditions, as are experienced along the coast or during cold weather, the paint may be thinned with a fast evaporating thinner such as VM&P naphtha; if it is being brushed in a fast drying region, such as West Texas or during hot weather, the painter may use a slower evaporating thinner, such as mineral spirits. The painters in the other districts, with which our Paint Engineer has discussed this change, were enthusiastic about the latitude.

We appreciate your calling this failure to our attention and hope that the above information will be of some assistance in improving your results with this enamel.

Very truly yours,

D. C. Greer
State Highway Engineer

By: L. Ortolani
L. Ortolani
Materials & Tests Engineer

KKM/t

San Augustine Grass Under Timber Structures

ZAY JOHNSON, *District Maintenance Engineer*

In all the counties of District 13, San Augustine Grass is extensively used for lawns, and it is used on all the grassed areas around the Highway Department section warehouses. The dense mat formed by this grass chokes out all other vegetation, yet it gets only a few inches high and, in this country, it is usually green throughout most of the winter. It goes dormant during severe winters, and the top runners die during extreme drouths.

This grass grows both in the shade and in the sun, but flourishes best in semi-shade.

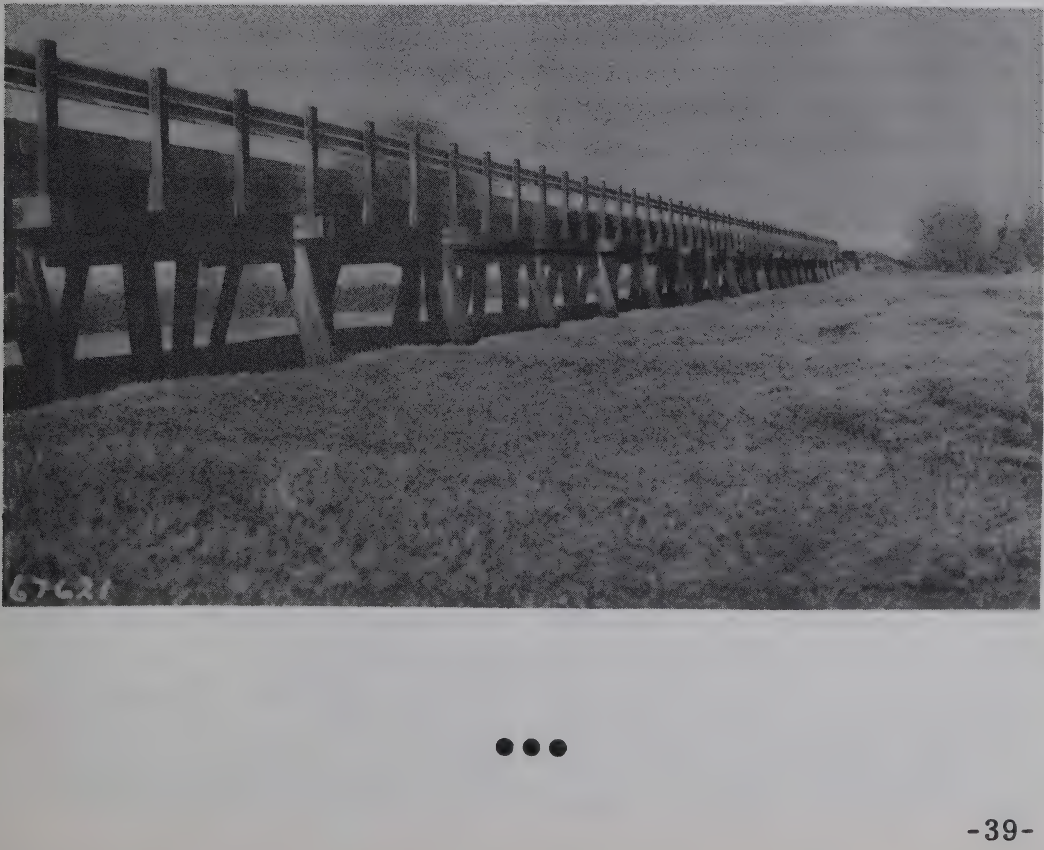
Several years ago, after discussing its possibilities in a Foremen's meeting, we decided to develop nurseries in favorable places throughout the District, and to make plantings to determine its effectiveness in choking out undesirable vegetation.

On State Highway 35 in Calhoun County, the bridges through the Guadalupe River and Green Lake Bottoms are timber pile trestles. The soil under and adjacent to these bridges is rich and usually moist. Weeds and Johnson Grass under and alongside them grew rank and thick. It was difficult to mow and there was a heavy yearly expense for mowing, hand-cutting, and burning necessary to eliminate the fire hazard to the bridges.

These places seemed to be ideal for the growth of this grass and good locations from which sod could be grown for use in other areas.

The pictures on the following pages show the results better than they can be described in writing. Without doubt, this work has improved conditions and lessened maintenance expense.

This work was done by Mr. D. B. Halliburton, Maintenance Foreman in Calhoun County, and he plans to extend the planting to the slopes and shoulders on this section of road as rapidly as conditions permit.


67621

* * *

Cracked Fuel Oil in Soils Stabilization

A. C. GENTRY, *District Engineer*

The use of cracked fuel oil on base stabilization work has been in progress for the past ten years in this district.

The cracked fuel oil used in this district is a by-product obtained in the manufacture of gasoline by refineries operating in the East Texas oil field. It is sold by these refineries to the railroad companies as fuel oil and to the cities and counties in this area for use in oiling streets and roads.

The first use of this oil as a base stabilization agent was made in 1940 on a project on U. S. 287 in Anderson County between the town of Cayuga and the Trinity River. We had underway at that time a soil stabilization project requiring the use of RC-2 as a stabilizing agent. As an experiment, we substituted East Texas Cracked Fuel Oil on a short section about one-quarter mile in length. This test section is still in good condition and maintenance on it has been considerably less than the balance of the project where RC-2 was used. A seal coat was applied over the entire four miles about three years ago. Picture 1 shows a view of this experimental section taken this year.

Since this experimental section was laid in 1940, we have completed or placed under contract approximately 50 miles of highway and approximately 150 miles of farm roads using cracked fuel oil as a stabilizing unit. Practically all of this type of base work is in the western quarter of the district where iron ore gravel is not available. During the calendar year of 1950 we placed under contract approximately 56 miles of farm roads requiring the use of this material for base stabilization. The bid price on the material furnished and applied varied from 6 1/2 to 7 1/4 cents per gallon. The average cost per mile of stabilized base and single asphalt surface on farm roads placed under contract during the calendar year of 1950 was $5, 387 per mile. The base and surface on these projects were 18 feet wide and 5 inches thick.

A check was made on the cost of maintaining base and surface on 75 miles of these stabilized roads for the fiscal year ending August 31, 1950. The average cost per mile was $102. 64. A check on the cost of maintaining base and surface on 92 miles of farm roads where iron ore gravel was used during the same fiscal year was $143. 12. The 92 miles of iron ore base roads were selected as having the equivalent traffic and soil conditions as the oil stabilized bases.

The amount of cracked fuel oil required for proper stabilization can, of course, best be determined by the use of pilot curves to arrive at the optimum amount of asphaltic material for the best results. We have found by experience, however, that any soil with a PI varying between 7 and 30 can be stabilized with this material and that it requires about six per cent of the asphaltic material by weight or about three-fourths of a gallon of asphaltic material per square yard per inch of compact base. Item 351, paragraph 4, sets up a specification for cracked fuel oil. I understand this specification was taken from old specifications used by this district for a number of years. Actually, a number of years ago, we were buying the by-product of the East Texas refineries for oil stabilization work without specifications. It became desirable to set up some type of specification in connection with Federal Aid Projects so we sent samples of cracked fuel oil from all the refineries operating in this area and asked the laboratory to give us the characteristics of these oils. From these tests we picked a maximum and minimum which would allow us to use any of the oils obtained in this area. We did this because, in so far as we could tell, all of the oils were satisfactory when used in the roads.

This material, of course, can be best applied during the hot summer months. However, we have excellent results by allowing the contractor to apply this material to the base in the fall and early winter months after which he lays it by until sometime in the following spring. He then mixes, processes and compacts the base, and applies the asphalt surface. In this way traffic can have the use of an oil road through the winter months.

U.S. 287, Anderson County, .7 mile west Trinity River looking west. Job completed September, 1940. Picture taken January, 1951.

Since the principal market for this material is for use as a fuel oil, the price to our contractors varies with the price of the fuel oil market usually determined by conditions on the Eastern Seaboard. For this reason, it is hard for our contractors to secure a firm quotation for the use of this material on base work several months ahead of the time it is to be used. This is one disadvantage of its use from the standpoint of a contractor. At all times, however, the price has been several cents per gallon under market prices for cut-backs, emulsion, etc.

We do not recommend the use of this material where iron ore, caliche, or other good base material is economically available; nor do we recommend it on heavy traffic highways. We do, however, think it has a definite place for use on low or average traffic farm roads where local base materials are not available and we think it actually gives better results than cut-backs used in stabilization work and costs in the neighborhood of $2, 000 per mile less in this area.

State Highway 259, Gregg County, Sabine River Bottom. Job completed January, 1942. Picture taken January, 1951. This section is under water for two or three weeks at a time. Traffic - 1010 cars per day in East Texas Oil Field.

FM 47, Van Zandt County, south of intersection with State Highway 243 looking south. Job completed October, 1949. Picture taken August, 1950.

TABULATION OF OVERWEIGHT AND OVERSIZE PERMITS ISSUED

AND ERRORS MADE

November 1, 1950 - February 28, 1951

District No.	Permits Issued	No. of errors Called to attention Of Districts	Comments
1	269	3	Also permits not submitted each week.
2	1745	2	Also permits not listed in numerical order on Transmittal letters, reversed.
3	3320	12	
4	1295	16	Does not submit permits each week. Very careless in listing permits and fees on Transmittal letters.
5	1342	11	Has in past been accepting cash for fees.
6	2132	10	
7	276	1	
8	2612	19	
9	393		Letters each week changing expiration dates, etc.
10	549	3	
11	256		Permits listed on Transmittal letters wrong.
12	3171	13	Type not clean, not always legible.
13	899		
14	328	1	
15	704	3	
16	3116	29	Careless in listing permits numerically on Transmittal letters.
17	130	1	
18	954	9	
19	666		Sometimes permits fail to arrive weekly.
20	1126	8	
21	399	2	
22	136		
23	523	3	
24	249	8	
25	259		Does not submit permits each week. Some permits carelessly written.
Totals	26849	154	

Erosion Control Around Wingwalls

D. S. SAFELY, *Senior Resident Engineer*
R. L. ROTHE, *Senior Designing Engineer*

District 11 is confronted with a maintenance problem on Farm-to-Market roads due to the combination of predominantly sandy soils, heavy rainfall, and the design of the wingwalls being used on our secondary bridges.

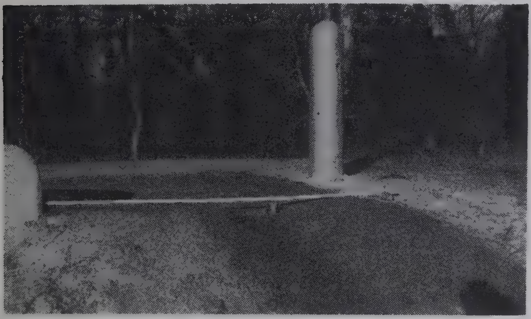
The surface treatments on these roads are either 16 or 18 feet in width. On a 20 to 24 foot roadway width bridge, this leaves an unsurfaced area between the edge of the asphalt surface and the wingwall which serves as a gutter for accumulated surface water. Excessive scour in this area, and especially around the end of the wing and down the slope, is quite common. In a number of cases, probably due to the dry weather cracks adjacent to the wingwalls, water will find its way under the wingwall and come out either under the back wall or on the outside of the wingwall. This condition is illustrated by pictures 1 and 2.

We have found that the most practical way to remedy this undesirable condition is to pave the area between the edge of the surfacing and the wingwalls as shown in picture 3. It will be noted that the paved surface has a slight depression with the low point being about 15 inches from and parallel to the wingwall. The purpose of this detail is to keep this water away from the wingwall where surface cracks might develop. It will also be noted that the paved gutter is extended about 5 feet beyond the end of the wing and then turned down the slope as illustra-

1. Where surface water is coming out and damaging header bank.

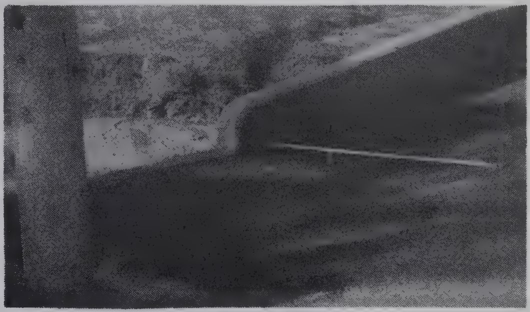
ted by picture 4. The purpose of this feature is to discharge the water a safe distance away from the end of the wings because maintaining header banks against these wings is a problem within itself without being agitated by surface water.

2. Hole near end of wing where surface water is entering.



4. Paved gutter around end of wingwall and down embankment slope.

We believe that some type of a pre-mixed material is most suitable for this type of work and best results can be obtained if the asphaltic material is placed on about 4 inches of well compacted flexible base material. On future projects, we intend to place the base course and asphalt top over the entire area between the wingwalls and construct drains as shown in the attached pictures.



3. Area between wingwall and edge of surfacing after placing paved gutter.

We are offering this information because we are quite certain that everyone engaged in maintaining Farm-to-Market roads is more or less confronted with this problem. We would appreciate hearing from those Districts who believe that they have mastered this problem in a more suitable manner.

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Texas Highway Department
Form 433-B 1-49-40m

K868-149-40m

INTEROFFICE MEMORANDUM

Date February 8, 1951

TO: Mr. Harkrider

FROM: Mr. - - - -

Responsible

Desk

SUBJECT: Claim No. - - -
- - - - - - - - -
- - - -, Texas
Injured 12-6-50

On Highway - - one mile from the city limits of - - - -, Texas, on December 6, 1950, at approximately 11 A.M. the day was very cold, below freezing. Mr. - - - and Mr. - - - - - - of - - - - had made a hook-up with a 6" flexible metal tubing from a temporary storage tank to a bobtail distributor truck. The tank was just inside the ROW and the truck parked in the ditch. The two men were trying to draw the cold RC-2 asphalt into the distributor. Due to the very low temperature of the asphalt in the hose, the asphalt would not run. The two men poured fuel on the ground all around the tank enveloping the tank in flames trying to warm the asphalt. This flame died down and then they used an uncontrollable flame by pouring fuel on the hose and ignited it. Mr. - - - was near the truck and Mr. - - - - was standing near the tank. According to Mr. - - - there was a belching sound inside the hose which ran up to the tank and a sudden explosion. The tank ripped and fell over almost penning - - - underneath and as he ran from the tank flaming asphalt fell on his back and neck. The asphalt ran down the ditch in flame and caught the distributor truck on fire.

The tank was destroyed and Mr. - - - suffered minor burns on his back and neck. He was taken to the - - - - - - Hospital for first aid treatment for the first degree burns on his back and neck and he then returned to work.

The - - - - Fire Department was summoned to the scene and with a truck hooked on to the distributor pulled it back several yards from the flaming asphalt. Eventually the fire was extinguished.

According to - - - - - - - there was some 5 or 6 thousand dollars worth of equipment destroyed.

Our recommendation to the supervisors involved was better instructions as to the handling of various types of asphalt and to put into practice the use of controlled rather than uncontrolled flames for heating.

Repairs to Concrete Girder Ends and Caps in District 25

PALMER MASSEY, *District Engineer*

Existing Bridge: Prairie Dog Town Fork of Red River on U. S. 287, two miles north of Estelline, consisting of 74 special design concrete girder spans 34.5 feet long. It was constructed in 1930 and has a roadway width of 22 feet.

Extent and Nature of Damaged Caps and Girders: For clarification minor repairs as referred to herein, were hair line cracks or thin spalled out sections only an inch or two deep. Major repairs were deeply spalled out sections where the old disintegrated concrete was required to be chipped out and where the bearing value of the girders on caps was definitely weakened. Referring to girder number 1 as being the east, or downstream outside girder, and number 4 as being the west, or upstream girder, the following summation is tabulated:

GIRDER	MAJOR REPAIRS		MINOR REPAIRS	
REF. NO.	CAPS	GIRDERS	CAPS	GIRDERS
1	1	3	1	6
2	0	0	2	1
3	2	1	0	0
4	1	11	0	4
Total	4	15	3	11

Material Used: The slush or bonding mixture consisted of the following proportional parts:

Two gallons or 50 pounds of Embeco.

One bag (1 cubic foot) of Normal Portland Cement.

Seventy-five pounds (3/4 cubic feet) sand screened through a Number 8 hardware cloth.

The filler mixture consisted of the following proportional parts:

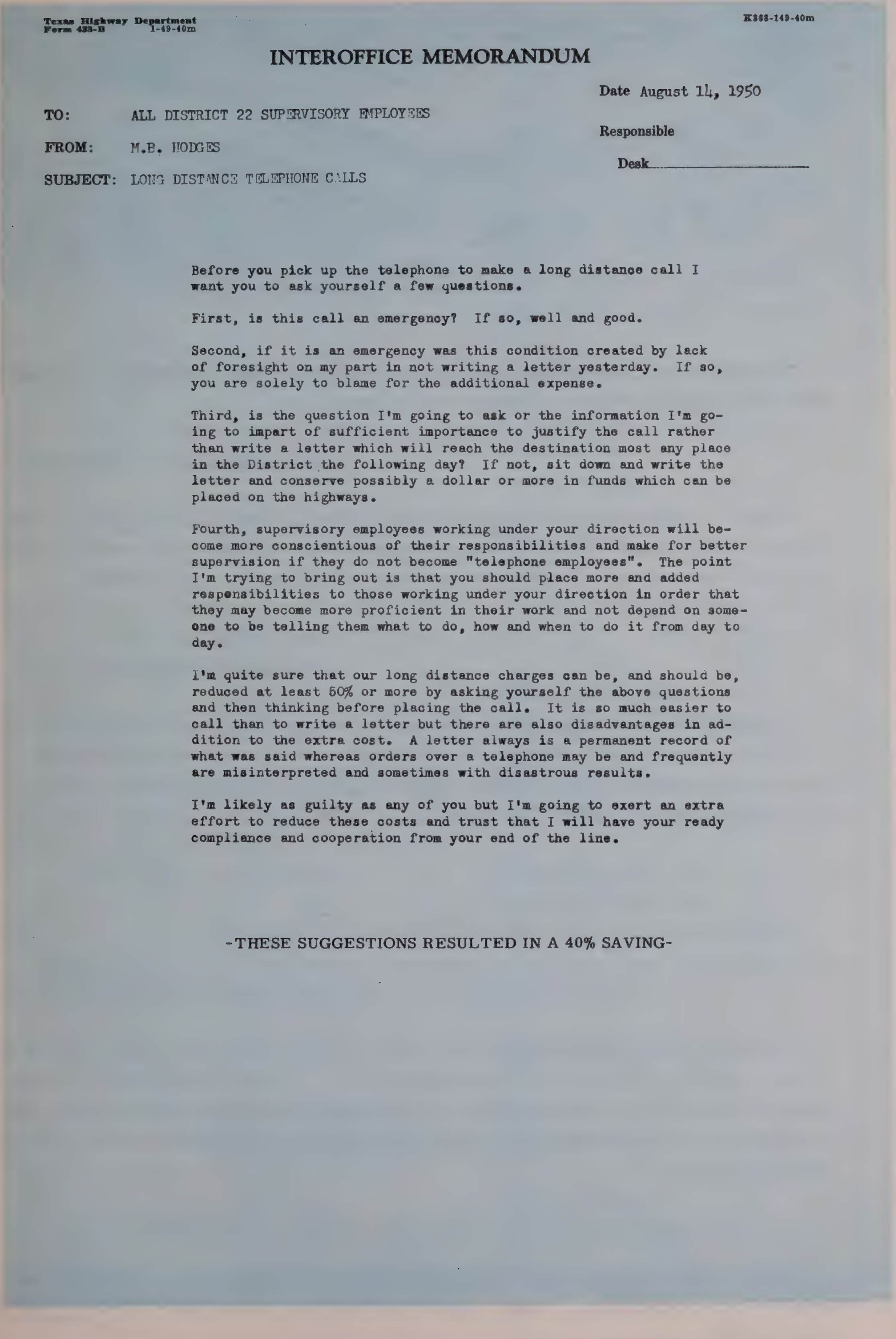
Fifteen pounds of Embeco.

One bag (1 cubic foot) of Normal Portland Cement.

Three cubic feet of sand screened through a Number 4 hardware cloth.

Method of Repair: The repairs were made with a cement gun machine. The disintegrated concrete was chiseled out. When the solid concrete was reached, the surface and the exposed reinforcing bars were sand blasted and sprinkled. While damp, the bonding coat was applied to the surface. Immediately after its application, the filler was applied to completely fill the hole. No attempt was made to finish the surface as hand trowelling tended to produce hair line cracks after curing. The surfaces were cured about four days. After ten days, a waterproofing compound was brushed onto the surfaces of old patches.

Conclusion: It will take a period of time to prove the value of this work. However, upon observing the solidity of the patching material going into place and the subsequent hardness and absence of cracks, it is believed that this procedure, in general, has great merit. Proper early curing, which can be applied immediately following the patching with wet burlap sacks, was noted to be essential in eliminating hair cracks. Although this report is not meant to be a testimonial for Embeco, the addition of such a compound to the mix is our reason for believing that this type of repair will be successful.



Texas Highway Department
Form 433-B 1-49-40m

K368-149-40m

INTEROFFICE MEMORANDUM

Date August 14, 1950

TO: ALL DISTRICT 22 SUPERVISORY EMPLOYEES

Responsible

FROM: M.B. HODGES

Desk

SUBJECT: LONG DISTANCE TELEPHONE CALLS

Before you pick up the telephone to make a long distance call I want you to ask yourself a few questions.

First, is this call an emergency? If so, well and good.

Second, if it is an emergency was this condition created by lack of foresight on my part in not writing a letter yesterday. If so, you are solely to blame for the additional expense.

Third, is the question I'm going to ask or the information I'm going to impart of sufficient importance to justify the call rather than write a letter which will reach the destination most any place in the District the following day? If not, sit down and write the letter and conserve possibly a dollar or more in funds which can be placed on the highways.

Fourth, supervisory employees working under your direction will become more conscientious of their responsibilities and make for better supervision if they do not become "telephone employees". The point I'm trying to bring out is that you should place more and added responsibilities to those working under your direction in order that they may become more proficient in their work and not depend on someone to be telling them what to do, how and when to do it from day to day.

I'm quite sure that our long distance charges can be, and should be, reduced at least 50% or more by asking yourself the above questions and then thinking before placing the call. It is so much easier to call than to write a letter but there are also disadvantages in addition to the extra cost. A letter always is a permanent record of what was said whereas orders over a telephone may be and frequently are misinterpreted and sometimes with disastrous results.

I'm likely as guilty as any of you but I'm going to exert an extra effort to reduce these costs and trust that I will have your ready compliance and cooperation from your end of the line.

-THESE SUGGESTIONS RESULTED IN A 40% SAVING-

"Comments From the Traveling Public"
OVER THE HIGHWAYS

...The black line in the middle of highway is a "stinker." Can't see it at night. Please paint white ones...

Los Angeles, California

...I went to Texas to see why Texans were always bragging. Now I know. Go ahead! You have a grand state. Do not like your traffic traps in towns with fine new cloverleaf highway approaches...

M.S. White
Greeley, Colorado

...Texas Highway Department is to be given highest award of all southern states for their wonderful care and maintenance of excellent roads. Signs, especially speed zoning curves, are so helpful to one not knowing road...

Redlands, California

...Roads are good but some bridges are narrow...

Saginaw, Michigan

...Words cannot begin to express how happy we were to be back in Texas after a drive to Washington D.C. The highways in Texas make this a drivers paradise. Congratulations for such a fine job. Texas is 50 years ahead of the other states on highway design and construction...

E.E. McKesson

...Could have more signs on distances to next city. I like it next best to my own state. May move here after next five or six years for winter...

Mercer, Pennsylvania

...Good highways and courteous people make the tourists feel much at home. I have traveled thirty-six states and the Republic of Mexico and find that Texas is second to none in point of highways and personality...

B. L. Hilliard
Little Rock, Arkansas

...Roads on which trip was made (US 80) were very good as a whole. Curves should be better marked...

Sgt. Stanley C. Gibson
Beaufort, South Carolina

...You have the safest, best marked highways for night and day driving yet met. Your towns are mostly modern and growing, your land looks good, and the people well fed and dressed. We were impressed...

R. E. Belter
% H. I. W. Co.
Honolulu, T. H.

...We wondered why mileage distances were not given on signs in East Texas as they were in the western part. We enjoyed San Antonio very much.

Don Derbyshire
Oakland, California

...Compliments to the Texas Highway Department on their information booths on the main highways. I think other states would benefit by following your example...

Winston Salem
North Carolina

...Construct signs showing distances to next gas station along road leaving El Paso going east on Highway 180...

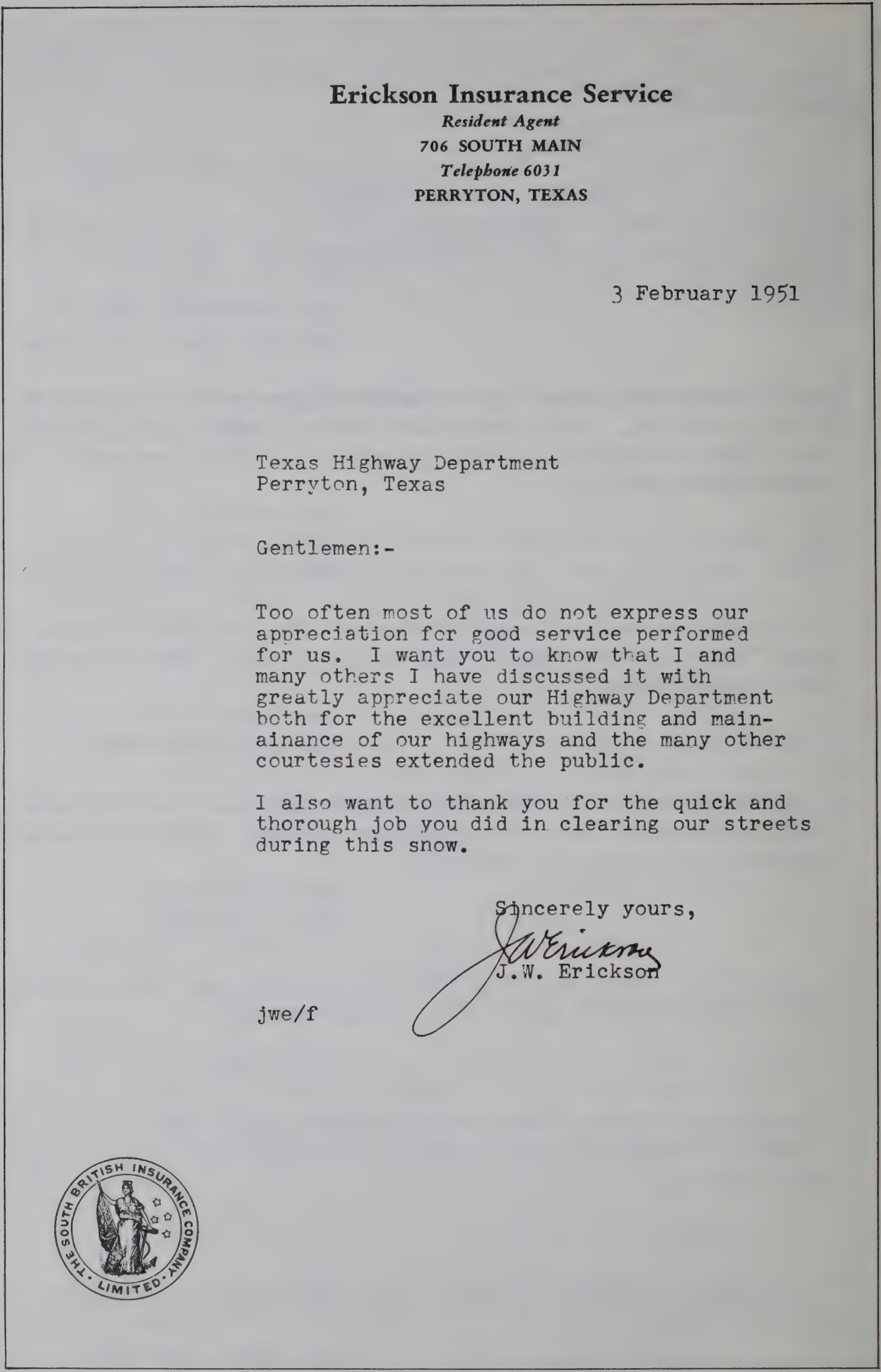
U. S. Army

...Highway from Texarkana to Texline adequately wide for pulling a trailer. Traffic around repairs nicely handled--much better than rerouting...

A. T. Dugas
Prescott, Arizona

...Roads too narrow in many parts. Texans drive at excessive speeds...

New York, New York



Erickson Insurance Service
Resident Agent
706 SOUTH MAIN
Telephone 6031
PERRYTON, TEXAS

3 February 1951

Texas Highway Department
Perryton, Texas

Gentlemen:-

Too often most of us do not express our appreciation for good service performed for us. I want you to know that I and many others I have discussed it with greatly appreciate our Highway Department both for the excellent building and mainainance of our highways and the many other courtesies extended the public.

I also want to thank you for the quick and thorough job you did in clearing our streets during this snow.

Sincerely yours,

JW Erickson

J.W. Erickson

jwe/f

THE SOUTH BRITISH INSURANCE COMPANY · LIMITED ·

Lake Charles, La.
February 14, 1951

Highway Department
State of Texas
Austin, Texas

Gentlemen:

I would like to compliment your department on the alertness and good work done during the recent ice storm. I was one of those caught on the highway during that time and was amazed to find that in no time at all after the storm hit the Highway Department had put gravel on all the bridges as well as warning signs along the road. This, no doubt, saved a lot of lives and I for one am thankful.

Sincerely,
Lolest G. Norrell
(Mrs. L. M. Norrell)
1703 9th Street
Lake Charles, La.

(Formerly: TEXAS)

60-19C 194th Street
Fresh Meadows, L.I., N.Y.
February 16, 1951

TEXAS HIGHWAY DEPARTMENT
Traffic Services Department
State Highway Building
Austin 26, Texas

Dear Sirs;

Last week, while driving through Texas to New York from San Francisco, we utilized the Information Service furnished by your department. We found the attendants courteous and helpful in every way. While obtaining information from the station at Waskom, my wife inadvertently left her purse in the Waskom station and we did not discover it's loss until arriving at Shreveport, Louisiana. We were very much upset inasmuch as the purse contained a considerable sum of money and immediately placed a call to the Waskom Information Service office. The office had closed for the evening but Mr. Richard Rape had found the purse and made arrangements with the telephone operator to have the call transferred to his residence. Upon contacting him, he reported that he had found the purse and would wait until we drove back to Waskom. We attempted to reward Mr. Rape for his service but he would not accept it and replied: "This is part of the Texas service".

We had just arrived in the states after being in Japan for two years and it was a pleasure to meet such a nice person. This was our first visit to your state and you can be assured that both Mrs. Hildebrand and I are now "Texas Boosters".

It will be appreciated if this letter can be forwarded to Mr. Rape for his information. On our next visit to Texas, we intend to stop and say "Howdy" to Mr. Rape and again thank him for his kindness and help.

Sincerely yours,

R.F. Hildebrand
R. F. HILDEBRAND